

What is claimed is:

[Claim 1] 1. A sorting conveyor comprising:

a sorting station forming a segment of a conveying line conveying articles in a conveying direction, the sorting station comprising:

a roller-top conveyor belt extending in width laterally from a first side to a second side and traveling in the conveying direction, the roller-top conveyor belt including a plurality of rollers having salient portions protruding outward from an outer surface of the belt to support a conveyed article and capable of being rotated to urge a conveyed article toward the first or second side of the belt, an elongated guide extending in length from a first end to a second end and suspended above the outer surface of the belt and selectively positionable in a first position traversing the width of the belt to intercept a conveyed article and guide it atop the rollers off the first or second side of the belt and in a second position not intercepting a conveyed article to allow it to continue to advance in the conveying direction.

[Claim 2] 2. A sorting conveyor as in claim 1 wherein the rollers include axles defining axes in the conveying direction about which the rollers rotate.

[Claim 3] 3. A sorting conveyor as in claim 1 further comprising a sensor disposed upstream of the sorting station for sensing a predetermined characteristic of a conveyed article to control the position of the elongated guide in the sorting station.

[Claim 4] 4. A sorting conveyor as in claim 1 wherein the elongated guide is selectively positionable at a third position intercepting a conveyed article and guiding it atop the rollers off the opposite side of the belt as the guide in the first position.

[Claim 5] 5. A conveyor belt as in claim 4 wherein the guide is selectively positionable at a fourth position not intercepting a conveyed article.

[Claim 6] 6. A sorting conveyor as in claim 1 wherein the sorting station comprises:

a linear drive disposed at a first location defining a lateral track above the roller-top conveyor belt and traversing the belt, the linear drive having a downwardly extending arm selectively driven along the track, and

wherein the first end of the elongated guide is attached to the arm and the guide is in the first position when the arm is at the first side of the belt and in the second position when the arm is at the second side of the belt.

[Claim 7] 7. A sorting conveyor as in claim 6 wherein the second end of the elongated guide is permanently affixed at one of the first and second sides of the belt at a second location upstream or downstream of the first location.

[Claim 8] 8. A sorting conveyor as in claim 6 further comprising:

a second linear drive disposed at a second location upstream of the first location and defining a lateral track above the roller-top conveyor belt that traverses the belt, the linear drive having a downwardly extending arm selectively driven along the track, and

wherein the second end of the elongated guide is attached to the arm and is movable from the first side of the belt to the second side of the belt.

[Claim 9] 9. A sorting conveyor as in claim 1 wherein the elongated guide includes rotatable elements arranged to engage a conveyed article in rolling contact when the guide is in the first position.

[Claim 10] 10. A sorting conveyor as in claim 9 wherein the elongated guide includes a conveyor belt segment arranged generally perpendicular to the plane defined by the outer surface of the roller-top conveyor belt and having roller wheels as the rotatable elements extending outward into rolling contact with a conveyed article.

[Claim 11] 11. A sorting conveyor as in claim 1 wherein the guide includes one or more elastic elements to adjust the length of the guide between the first and second positions.

[Claim 12] 12. A sorting conveyor as in claim 11 wherein at least one of the elastic elements is at the first end of the elongated guide.

[Claim 13] 13. A sorting conveyor as in claim 1 wherein the sorting station further comprises a lift for lifting the guide into the second position high enough above the outer surface of the roller-top belt to avoid intercepting a conveyed article.

[Claim 14] 14. A sorting conveyor as in claim 1 wherein the sorting station comprises:

- a rotational drive disposed above the roller-top conveyor belt, the linear drive having a downwardly extending rotatable pivot shaft defining a pivot axis intersecting the belt generally midway across the width of the belt,

- wherein the pivot shaft is attached to the elongated guide generally midway between the first end and the second end to selectively rotate the belt between the first position at an angle relative to the conveying direction to divert a conveyed article off the first side of the belt and a third position at a different angle relative to the conveying direction to divert an article off the second side of the belt.

[Claim 15] 15. A sorting conveyor as in claim 14 wherein the angle of the guide in the first position differs from the different angle of the guide in the second position by about 90°.

[Claim 16] 16. A sorting conveyor as in claim 1 wherein the elongated guide is linear.

[Claim 17] 17. A sorting conveyor comprising:

- a sorting station forming a segment of a conveying line conveying articles in a conveying direction, the sorting station comprising:

- a roller-top conveyor belt extending in width laterally from a first side to a second side and traveling in the conveying direction, the

roller-top conveyor belt including a plurality of rollers protruding outward of a horizontal upper surface of the belt to support a conveyed article and arranged to rotate about axes generally in the conveying direction,
an elongated guide forming a generally vertical wall extending in length from a first end to a second end and suspended above the upper surface of the belt and selectively positionable in one or more blocking orientations crossing the belt from the first side to the second side to intercept a conveyed article and guide it atop the rollers off the first or second side of the belt and in one or more non-blocking orientations not intercepting a conveyed article to allow it to continue to advance in the conveying direction.

[Claim 18] 18. A sorting conveyor as in claim 17 wherein the elongated guide includes roller wheels extending from the wall and rotatable about vertical axes.

[Claim 19] 19. A sorting conveyor as in claim 17 wherein the elongated guide includes elastic elements to adjust its length.

[Claim 20] 20. A sorting conveyor as in claim 17 wherein the sorting station comprises a drive disposed above the conveyor belt and coupled to the elongated guide to position the wall across the upper surface of the belt at one or more angles relative to the conveying direction.

[Claim 21] 21. A sorting conveyor as in claim 20 wherein the drive positions the wall at a first angle oblique to the conveying direction and at a second angle mirroring the first angle about the centerline of the belt.

[Claim 22] 22. A sorting conveyor as in claim 20 wherein the drive rotates the guide about its midpoint.

[Claim 23] 23. A sorting conveyor as in claim 20 wherein the drive includes a first linear drive having a moving element selectively shuttling laterally across the belt, the moving element being attached to the first end of the guide to translate the first end of the guide laterally between the first and second sides of the belt.

[Claim 24] 24. A sorting conveyor as in claim 23 wherein the drive includes a second linear drive disposed upstream of the first linear drive and having a moving element selectively shuttling laterally across the belt, the moving element being attached to the second end of the guide to translate the second end of the guide laterally between the first and second sides of the belt.

[Claim 25] 25. A sorting conveyor as in claim 17 wherein the sorting station further comprises a lift connected to the guide for lifting the guide above the upper surface of the roller-top belt into a non-blocking orientation and lowering the guide into a blocking orientation.

[Claim 26] 26. A sorting conveyor as in claim 17 further comprising a sensor disposed upstream of the sorting station for sensing a predetermined characteristic of a conveyed article to activate the drive to selectively orient the elongated guide in the sorting station.

[Claim 27] 27. A sorting conveyor comprising:

a sorting station forming a segment of a conveying line conveying articles in a conveying direction, the sorting station comprising:

a roller-top conveyor belt extending laterally from a first side to a second side and traveling in the conveying direction, the roller-top conveyor belt including a plurality of rollers protruding outward of an upper surface of the belt to support a conveyed article and arranged to rotate about axes generally in the conveying direction, an elongated guide forming a wall extending in length from a first end to a second end above the upper surface of the belt;

a drive having a moving element attached to the guide to adjust the orientation of the wall;

a sensor disposed along the conveying line to sense a characteristic of a conveyed article at a position along the conveying line upstream of the sorting station and to send a signal indicative of the characteristic;

a controller receiving the signal from the sensor and controlling the drive to adjust the orientation of the wall as a function of the signal associated with a conveyed article.

[Claim 28] 28. A sorting conveyor comprising:

a bidirectional sorting station forming a segment of a conveying line conveying articles in a conveying direction, the sorting station comprising:

a roller-top conveyor belt extending in width laterally from a first side to a second side and traveling in the conveying direction, the roller-top conveyor belt including a plurality of rollers having salient portions protruding outward from an outer surface of the belt to support a conveyed article and capable of being rotated to urge a conveyed article toward the first or second side of the belt, first and second exit conveyors abutting the belt at the first and second sides, respectively, for receiving conveyed articles diverted off the first and second sides of the belt, an elongated guide extending in length from a first end to a second end and suspended above the outer surface of the belt and selectively positionable in:

a first diverting position traversing the width of the belt with the first end of the guide at the first side of the belt and the second end of the guide at the second side of the belt and downstream of the first end to intercept a conveyed article and guide it atop the rollers off the second side of the belt onto the second exit conveyor,

a second diverting position traversing the width of the belt with the first end of the guide at the second side of the belt and the second end of the guide at the first side of the belt and downstream of the first end to intercept a conveyed article and guide it atop the rollers off the first side of the belt onto the first exit conveyor,

and a bypass position not intercepting a conveyed article to allow it to continue to advance in the conveying direction past the sorting station.

